

الف) $۲۷^\circ = (x) \text{Rad} \Rightarrow \frac{۲۷}{۱۸۰} \times \frac{\pi}{۲} = \frac{۳\pi}{۲۰}$

ب) $۱۲۵^\circ = (x) \text{Rad} \Rightarrow \frac{۱۲۵}{۱۸۰} \times \frac{\pi}{۲} = \frac{۲۵\pi}{۳۶}$

ج) $\frac{۵\pi}{۱۲} \text{rad} = (x)^\circ \Rightarrow \frac{۵\pi}{۱۲} \times \frac{۱۸۰}{\pi} = ۷۵^\circ$

$\Rightarrow \frac{۴\pi}{9} \text{rad} = (x)^\circ \Rightarrow \frac{۴\pi}{9} \times \frac{۱۸۰}{\pi} = ۸۰^\circ$

$۱۰\alpha^\circ$

$\frac{۱۲\omega\alpha}{9} = (x)^\circ \Rightarrow \frac{12}{18} = \frac{۱۲\omega\alpha}{9} \Rightarrow ۱۲, \omega\alpha^\circ$

$\frac{\alpha\pi}{\omega} = (x)^\circ \Rightarrow \frac{\alpha\pi}{\omega} \times \frac{۱۸۰}{\pi} = ۲۲, \omega\alpha^\circ$

$\rightarrow ۱۰\alpha^\circ + ۱۲, \omega\alpha^\circ + ۲۲, \omega\alpha^\circ = ۴\omega\alpha^\circ \Rightarrow ۴\omega\alpha^\circ = ۱۸^\circ \rightarrow \alpha = ۴$

ان) $\cos 9^\circ \cos ۳^\circ - \sin 9^\circ \sin ۳^\circ - \tan ۴۵^\circ + ۲ \cot ۴۵^\circ$

$\rightarrow \frac{1}{2} \left(\frac{\sqrt{3}}{2} \right) - \frac{\sqrt{3}}{2} \left(\frac{1}{2} \right) - 1 + 2 = \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} + 1 = 1$

ب) $\frac{\tan ۳^\circ + \tan ۴۵^\circ + \tan ۹^\circ}{\cot ۳^\circ - \cot ۹^\circ} = \frac{\frac{1}{\sqrt{3}} + 1 + \frac{1}{\sqrt{3}}}{\sqrt{3} - \frac{1}{\sqrt{3}}} = \frac{\frac{2}{\sqrt{3}} + 1}{\frac{3-1}{\sqrt{3}}} = \frac{\frac{2+\sqrt{3}}{\sqrt{3}}}{\frac{2}{\sqrt{3}}} = \frac{2+\sqrt{3}}{2}$

$-\sin ۳^\circ \cos ۹^\circ + \cos ۳^\circ \sin ۹^\circ = \sin \theta \Rightarrow -\frac{1}{2} \left(\frac{1}{2} \right) + \frac{\sqrt{3}}{2} \left(\frac{\sqrt{3}}{2} \right) = \sin \theta$

$= -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} = \frac{1}{2} = \sin \theta = \sin 30^\circ = \frac{1}{2} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{2} \Rightarrow ۴۵^\circ$

$\rightarrow \tan ۴۵^\circ = 1$

$\frac{۲ \tan ۳^\circ (1 - \tan ۴۵^\circ)}{(1 - \cot ۹^\circ)^2} = \frac{\frac{2\sqrt{3}}{3} (1 - \frac{1}{\sqrt{3}})}{(1 - \frac{1}{3})^2} = \frac{\frac{2\sqrt{3}}{3} \cdot \frac{\sqrt{3}-1}{\sqrt{3}}}{(\frac{2}{3})^2} = \frac{2(\sqrt{3}-1)}{2} = \sqrt{3}-1$

$\rightarrow \frac{\sqrt{3}}{2} = ۳$

$$\tan \theta = \omega$$

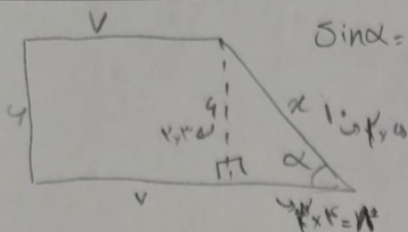
$$\frac{\sin \theta}{\cos \theta} = \omega$$

$$\rightarrow \sin \theta = \omega \cos \theta$$

$$\frac{13 \sin \theta - \cos \theta}{\sin \theta - 13 \cos \theta} = \frac{13 \cos \theta - \cos \theta}{\omega \cos \theta - 13 \cos \theta}$$

$$\rightarrow \frac{13 \cos \theta}{\cos \theta} = 13$$

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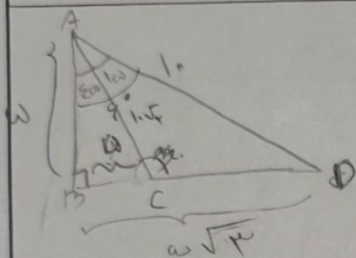


$$\sin \alpha = \frac{4}{5}$$

$$\rightarrow \sin \alpha = \frac{4}{5} \Rightarrow \frac{4}{1} = \frac{4}{5} \rightarrow \alpha = 1$$

$$P = V + L + 13 + 4 = 20$$

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$$\cos 40^\circ = \frac{1}{2} = \frac{AB}{10} \rightarrow AB = 20$$

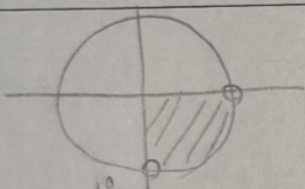
$$\sin 40^\circ = \frac{\sqrt{3}}{2} = \frac{BC}{10} \rightarrow BC = 5\sqrt{3}$$

$$\cos 20^\circ = \frac{10}{AC} = \frac{\sqrt{3}}{2} \rightarrow AC = 10\sqrt{3}$$

$$\sin 20^\circ = \frac{BC}{AC} = \frac{\sqrt{3}}{2} \rightarrow BC = 10$$

$$BD = BC + CD \rightarrow CD = 10(\sqrt{3} - 1)$$

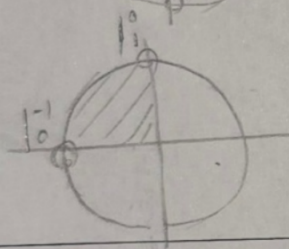
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$$40^\circ < \alpha < 90^\circ$$

نامی

(الف)



$$140^\circ$$

از بیشتر از 90 درجه
به سمت چپ می‌شود

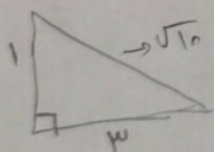
$$90^\circ < \alpha < 180^\circ$$

نامی

(ب)

از بیشتر از 180 درجه
به سمت چپ می‌شود

$$\tan \alpha = \frac{1}{\sqrt{3}} \rightarrow \tan \alpha = \frac{1}{\sqrt{3}}$$



$$\sin \alpha = \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{3}$$

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